Claims

[c1]   What is claimed is:

1. A method for diagnosing an optical disk drive comprising:

(a) utilizing an optical pick-up unit for outputting an incident laser to a track on an optical disk and reading a reflecting laser modulated by the track for generating a tracking error signal and a focusing error signal;

(b) calculating a tracking driving signal according to the tracking error signal, and calculating a focusing driving signal according to the focusing error signal;

(c) utilizing a firmware of the optical disk drive for mixing a noise with the focusing driving signal to generate a test focusing driving signal;

(d) adjusting a position of the optical pick-up unit corresponding to the optical disk according to the test focusing driving signal and the tracking driving signal; and

(e) determining whether the focusing error signal outputted from the optical pick-up unit interferes with the tracking error signal outputted from the optical pick-up unit according to the tracking error signal.

[c2]   2. The method of claim 1 wherein step (e) further com-

prises:

detecting a peak-to-peak voltage of the tracking error signal for determining whether the focusing error signal outputted from the optical pick-up unit interferes with the tracking error signal outputted from the optical pick-up unit.

[c3]   3. The method of claim 1 wherein the noise is a sine wave, step (c) utilizes the firmware to mix the sine wave with the focusing driving signal during a plurality of periods, the sine wave corresponds to different frequencies during the periods, and a frequency of the sine wave is limited within a predetermined frequency range.

[c4]   4. The method of claim 3 wherein the frequency of the sine wave is gradually increased from a minimum value of the predetermined frequency range during the periods.

[c5]   5. The method of claim 3 wherein the frequency of the sine wave is gradually decreased from a maximum value of the predetermined frequency range during the periods.

[c6]   6. The method of claim 1 wherein the tracking error signal and the focusing error signal are analog signals, step (b) further comprises converting the focusing driving

signal into a corresponding digital signal, and step (c) further comprises converting the test focusing driving signal into a corresponding digital signal.

[c7] 7. The method of claim 1 wherein the tracking error signal and the focusing error signal are analog signals, step (b) further comprises converting the tracking error signal and the focusing error signal into corresponding digital signals, and running the firmware to calculate the tracking driving signal and the focusing driving signal, and step (c) further comprises converting the test focusing driving signal and the tracking driving signal into corresponding analog signals.

[c8] 8. A method for diagnosing an optical disk drive comprising:
(a) utilizing an optical pick-up unit for outputting an incident laser to a track on an optical disk and reading a reflecting laser modulated by the track for generating a tracking error signal and a focusing error signal;
(b) calculating a tracking driving signal according to the tracking error signal, and calculating a focusing driving signal according to the focusing error signal;
(c) utilizing a firmware of the optical disk drive for mixing a noise with the tracking driving signal to generate a test tracking driving signal;
(d) adjusting a position of the optical pick-up unit corre-

sponding to the optical disk according to the test track-
ing driving signal and the focusing driving signal; and

(e) determining whether the tracking error signal out-
putted from the optical pick-up unit interferes with the
focusing error signal outputted from the optical pick-up
unit according to the focusing error signal.

[c9]   9. The method of claim 8 wherein step (e) further com-
prises:
detecting a peak-to-peak voltage of the focusing error
signal for determining whether the tracking error signal
outputted from the optical pick-up unit interferes with
the focusing error signal outputted from the optical
pick-up unit.

[c10]   10. The method of claim 8 wherein the noise is a sine
wave, step (c) utilizes the firmware to mix the sine wave
with the tracking driving signal during a plurality of peri-
ods, the sine wave corresponds to different frequencies
during the periods, and a frequency of the sine wave is
limited within a predetermined frequency range.

[c11]   11. The method of claim 10 wherein the frequency of the
sine wave is gradually increased from a minimum value
of the predetermined frequency range during the peri-
ods.

[c12]   12. The method of claim 10 wherein the frequency of the sine wave is gradually decreased from a maximum value of the predetermined frequency range during the periods.

[c13]   13. The method of claim 8 wherein the tracking error signal and the focusing error signal are analog signals, step (b) further comprises converting the tracking driving signal into a corresponding digital signal, and step (c) further comprises converting the test tracking driving signal into a corresponding digital signal.

[c14]   14. The method of claim 8 wherein the tracking error signal and the focusing error signal are analog signals, step (b) further comprises converting the tracking error signal and the focusing error signal into corresponding digital signals, and running the firmware to calculate the tracking driving signal and the focusing driving signal, and step (c) further comprises converting the test tracking driving signal and the focusing driving signal into corresponding analog signals.

[c15]   15. An optical disk drive comprising:
an optical pick-up unit for outputting an incident laser to a track on an optical disk and reading a reflecting laser modulated by the track for generating a tracking error signal and a focusing error signal;

a focusing controller for calculating a focusing driving signal according to the focusing error signal;

a tracking controller for calculating a tracking driving signal according to the tracking error signal;

a memory for storing a noise processing program;

a microprocessor electrically connected to the memory for running the noise processing program to mix a noise with the focusing driving signal to generate a test focusing driving signal; and

a servo system electrically connected to the microprocessor and the tracking controller for adjusting a position of the optical pick-up unit corresponding to the optical disk according to the test focusing driving signal and the tracking driving signal.

[c16] 16. The optical disk drive of claim 15 wherein the focusing controller and the tracking controller are hardware circuits, and are respectively connected to the optical pick-up unit.

[c17] 17. The optical disk drive of claim 15 wherein the focusing controller and the tracking controller are software programs run by the microprocessor, and the noise processing program, the focusing controller, and the tracking controller are stored in a firmware of the optical disk drive.

[c18]   18. An optical disk drive comprising:

an optical pick-up unit for outputting an incident laser to a track on an optical disk and reading a reflecting laser modulated by the track for generating a tracking error signal and a focusing error signal;

a focusing controller for calculating a focusing driving signal according to the focusing error signal;

a tracking controller for calculating a tracking driving signal according to the tracking error signal;

a memory for storing a noise processing program;

a microprocessor electrically connected to the memory for running the noise processing program to mix a noise with the tracking driving signal to generate a test tracking driving signal; and

a servo system electrically connected to the microprocessor and the tracking controller for adjusting a position of the optical pick-up unit corresponding to the optical disk according to the test tracking driving signal and the focusing driving signal.

[c19]   19. The optical disk drive of claim 18 wherein the focusing controller and the tracking controller are hardware circuits, and are respectively connected to the optical pick-up unit.

[c20]   20. The optical disk drive of claim 18 wherein the focusing controller and the tracking controller are software

programs run by the microprocessor, and the noise processing program, the focusing controller, and the tracking controller are stored in a firmware of the optical disk drive.